

Bikeways Accessible to Everyone

The Bikeways Plan builds on previous planning efforts both completed by the MIC as well as agencies and organizations. There are numerous planning efforts that have informed the detail into which each of these plans gives recommendations regarding the bicycle network of bikeway planning efforts that while not officially adopted but have none-the-less have informed Downtown Duluth Bikeways Audit & Survey, Michigan Street Protected Bikeway Demonstration to School plans.

Nationally, innovation of urban bicycle infrastructure was transforming urban streets and rural cities across the United States. As new designs were being tried, new resources for urban bikeways became available, particularly the NACTO guides. This all led to the conclusion that a complete update was needed to better reflect the best practices and new urban street designs being developed.

Therefore in 2010, work began in a re-thinking of the bikeway system. The MIC worked closely with some cases served in a supporting role and in others as the lead, but all with the intention of incorporating new ideas into the updated Bikeways Plan.

Route selection is critical. Bikeways will under-perform when routing is illogical, require frequent turns, or require shared lane usage on roadways with high traffic speeds and volumes.

Bikeways Route Planning - Decision-making Criteria

Designating a system of preferred routes.

Candidate routes should meet the following criteria:

Bikeway Planning Efforts

- 1975 Duluth Bikeways Plan
- 1994 Duluth-Superior Metropolitan Bikeways Plan
- 1998 Duluth-Superior Metro Area Bikeways Status Report & Implementation Plan
- 2007 Proctor Master Trails Plan

2010 – Connecting Duluth Report

2011 – Duluth Trail & Bikeway Plan

2013-14 – Plan for Duluth’s Bikeways

2015 – Downtown Duluth Bikeways Audit & Survey

2015 Hermantown-Proctor Munger Trail Spur

2016 Duluth Township Trails Plan

2017 – Cross City Trail Mini-Master Plan

2017 – Protected Bikelane Demonstration Project

2018 – Canosia Township Trails Plan

Upcoming bikeway planning efforts:

2019 – Superior Active Transportation Plan

2019 – Campus Connector Mini-Master Trails Plan

1. Low-stress bikeway network – continuous and direct route.
2. Designed with the end user in mind, people who are riding bicycles for transportation (not recreation).
3. Trips – design for people making a variety of trips (majority) and not only the commute to work trip.
4. Slope – avoid steep grades
 - a. Any street or path with a grade greater than 13% must be avoided (not reasonable).
 - b. Any street or path with a grade between 5-8% can be a bikeway for only 1 consecutive block if no other option is available.
5. Public Health - designed to for people to conduct their activities via bicycle as part of their everyday routine (Focus on 2-5 miles or the length of a typical urban bicycle trip.)
6. All ages and all abilities network – building a system that the largest number of people can utilize not just the confident road cyclists.
7. Direct access to destinations:
 - a. Public School – where attendance is required by law.
 - b. Public transit centers and stations
 - c. Civic & Community Institution (town hall, city hall, county courthouse)– places where public decisions are made i.e. places where public meetings are held.
 - d. Food Distribution– places where people purchase or pick up food

- e. Commercial destination centers –

- f. Medical Facilities – hospitals, doctor’s office, pharmacy
- g. Recreational places – parks and trails.
- 8. Strategic connections
- 9. Desire line for bicyclists – closely follow a desire line for bicycle travel

Bikeway Types.

Bike Lanes

Conventional Bike Lanes- The bike lane is located adjacent to motor vehicle travel lanes and flows in the same direction as motor vehicle traffic. **Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge, or parking lane. This facility type may be located on the left side when installed on one-way streets, or may be buffered if space permits.**

Buffered Bike Lanes- Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.

Contra-Flow Bike Lanes- Contra-flow bicycle lanes are bicycle lanes designed to allow bicyclists to ride in the opposite direction of motor vehicle traffic. They convert a one-way traffic street into a two-way street: one direction for motor vehicles and bikes, and the other for bikes only. **Contra-flow lanes are separated with yellow center lane striping. Combining both direction bicycle travel on one side of the street to accommodate contra-flow movement results in a two-way cycle track.**

Left-Side Bike Lanes- Left-side bike lanes are conventional bike lanes placed on the left side of one-way streets or two-way median divided streets.

Cycle Tracks

One-Way Protected Cycle Tracks- One-way protected cycle tracks are bikeways that are at street level and use a variety of methods for physical protection from passing traffic. **A one-way protected cycle track may be combined with a parking lane or other barrier between the cycle track and the motor vehicle travel lane.**

Raised Cycle Tracks- Raised cycle tracks are bicycle facilities that are vertically separated from motor vehicle traffic. **Many are paired with a furnishing zone between the cycle track and motor vehicle travel lane and/or pedestrian area. A raised cycle track may allow for one-way or two-way travel by bicyclists.**

Two-Way Cycle Tracks- Two-way cycle tracks (also known as protected bike lanes, separated bikeways, and on-street bike paths) are physically separated cycle tracks that allow bicycle movement in both directions on one side of the road. **Two-way cycle tracks share some of the same design characteristics as one-way tracks, but may require additional considerations at driveway and side-street crossings.**

Bicycle Boulevards

Route Planning- Direct access to destinations

Route selection for bicycle boulevards is critical. Bicycle boulevards will not work if they are routed in illogical ways, if they require frequent or unnecessary stopping, or if they follow higher traffic speed and volume roadways. Bicycle boulevards have the potential to play a key role in a low-stress bikeway network, as they can complement, and provide strategic connections between, off-street paths, cycle tracks and bike lanes.

Signs and Pavement Markings- Easy to find and to follow

Signs and pavement markings create the basic elements of a bicycle boulevard. They indicate that a roadway is intended as a shared, slow street, and reinforce the intention of priority for bicyclists along a given route. Signs and pavement markings alone do not create a safe and effective bicycle boulevard, but act as reinforcements to other traffic calming and operational changes made to the roadway.

Speed Management- Slow motor vehicle speeds

Speed Management measures for bicycle boulevards bring motor vehicle speeds closer to those of bicyclists. **Reducing speeds along the bicycle boulevard improves the bicycling environment by reducing overtaking events, enhancing drivers' ability to see and react, and diminishing the severity of crashes if they occur. Speed management is critical to creating a comfortable and effective bicycle boulevard.**

Volume Management- Low or reduced motor vehicle volumes

Volume Management measures reduce or discourage thru traffic on designated bicycle boulevard corridors by physically or operationally reconfiguring select corridors and intersections along the route. **On roadways with shared travel lanes such as bicycle boulevards, motor vehicle traffic volumes significantly impact bicyclist comfort. Higher vehicle volumes decrease comfort and may lead to a greater potential for conflicts, as well as a loss of perceived safety.**

Minor Street Crossings- Minimal bicyclist delay

Minor Street Crossings for bicycle boulevards typically involve the intersection of two residential or local streets with low motor vehicle volumes and speeds. **At intersections with local streets and minor collectors, bicycle boulevards should have right-of-way priority and reduce or minimize delay by limiting the number of stop signs along the route. Stretches of at least a half mile or more of continuous travel without stop sign control are desirable.**

Major Street Crossings- Safe and convenient crossings

Major street crossings may pose a significant barrier the effectiveness and quality of a bicycle boulevard. Treatments of high quality should be selected to mitigate these barriers.

Offset Intersections- Clear and safe navigation

Offset Intersections are junctions at which two streets in a designated bicycle boulevard corridor align asymmetrically with an intersecting roadway. Since bicycle boulevards typically utilize local streets, bicyclists are likely to encounter discontinuities in the street grid that require them to turn briefly onto another street before resuming their original direction. Offset intersection treatments are categorized into treatments for major street crossing and treatments for minor street crossings.

Green Infrastructure- Enhancing environments

Incorporating green infrastructure into transit street design can improve water quality, detain stormwater flows, reduce the volume of stormwater runoff, and relieve burden on municipal water treatment systems.

Intersections

Bike Boxes- A bike box is a designated area at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible way to get ahead of queuing traffic during the red signal phase.

Intersection Crossing Markings- Intersection crossing markings indicate the intended path of bicyclists. They guide bicyclists on a safe and direct path through intersections, including driveways and ramps. They provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane

Two-Stage Turn Queue Boxes- Two-stage turn queue boxes offer bicyclists a safe way make left turns at multi-lane signalized intersections from a right side cycle track or bike lane, or right turns from a left side cycle track or bike lane. Two-stage turn queue boxes may also be used at unsignalized intersections to simplify turns from a bicycle lane or cycle track, as for example, onto a bicycle boulevard. At midblock crossing locations, a two-stage turn queue box may be used to orient bicyclists properly for safe crossings. Multiple positions are available for queuing boxes, depending on intersection configuration.

Median Refuge Island- Median refuge islands are protected spaces placed in the center of the street to facilitate bicycle and pedestrian crossings. Crossings of two-way streets are facilitated by allowing bicyclists and pedestrians to navigate only one direction of traffic at a time. Medians configured to protect cycle tracks can both facilitate crossings and also function as two-stage turn queue boxes.

Through Bike Lanes- For bicyclists traveling in a conventional bike lane or from a truncated cycle track, the approach to an intersection with vehicular turn lanes can present a significant challenge. For this reason it is vital that bicyclists are provided with an opportunity to correctly position themselves to avoid conflicts with turning vehicles.

Combined Bike lanes/ Turn Lane- A combined bike lane/turn lane places a suggested bike lane within the inside portion of a dedicated motor vehicle turn lane. Shared lane markings or conventional bicycle stencils with a dashed line can delineate the space for bicyclists and motorists within the shared lane or indicate the intended path for through bicyclists.

Cycle Track Intersection Approach- The approach to an intersection from a cycle track should be designed to reduce turn conflicts for bicyclists and/or to provide connections to intersecting bicycle facility types. This is typically achieved by removing the protected cycle track barrier or parking lane (or lowering a raised cycle track to street level), and shifting the bicycle lane to be closer to or shared with the adjacent motor vehicle lane.

Signals

Bicycle Signal Heads- A bicycle signal is an electrically powered traffic control device that should only be used in combination with an existing conventional traffic signal or hybrid beacon.

Signal Detection and Actuation- Bicycle detection is used at actuated signals to alert the signal controller of bicycle crossing demand on a particular approach. Bicycle detection occurs either through the use of push-buttons or by automated means (e.g., in-pavement loops, video, microwave, etc).

Active Warning Beacon for Bike Route at Unsignalized intersection- Active warning beacons are user-actuated amber flashing lights that supplement warning signs at unsignalized intersections or mid-block crosswalks. Beacons can be actuated either manually by a push-button or passively through detection.

Hybrid Beacon for Bike Route Crossing of Major Street- A hybrid beacon, also known as a High-intensity Activated Crosswalk (HAWK), consists of a signal-head with two red lenses over a single yellow lens on the major street, and pedestrian and/or bicycle signal heads for the minor street.

Signing and Marking

Colored Bike Facilities- Colored pavement within a bicycle lane increases the visibility of the facility, identifies potential areas of conflict, and reinforces priority to bicyclists in conflict areas and in areas with pressure for illegal parking.

Colored Pavement Material Guidance- Colored pavement can be utilized either as a corridor treatment along the length of a bike lane or cycle track, or in limited locations as a spot treatment, such as a bike box, conflict area, or intersection crossing marking. Colored pavement for use within bikeways treatments may take the form of an overlay, when the colored material is placed on top of the pavement or embedded, when the colored material is mixed into the pavement.

Shared Lane Markings- Shared Lane Markings (SLMs), or “sharrows,” are road markings used to indicate a shared lane environment for bicycles and automobiles.

Bike Route Wayfinding- A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.